CO_2

Summary of a published paper on the net carbon dioxide balance for the Fischer-Tropsch process compared with conventional processes

1. Gray, David, and Glen Tomlinson, "CO_2 Emissions from Fischer-Tropsch Fuels," Mitretek Systems, Fuels, Lubricants, Engines and Emissions Meeting, Arizona, 1999.

   Carbon emissions, when compared to gasoline from crude, diesel from crude and Fischer-Tropsch from coal/gas are determined to be 45% less than gasoline from crude as the standard. This reduction per mile includes production, combustion and relative efficiency. Overall, the study demonstrates the lower carbon emissions from Fischer-Tropsch technology.

CO_2 Emissions from Fischer-Tropsch Fuels

David Gray and Glen Tomlinson

Mitretek Systems

Paper presented at the Fuels, Lubricants, Engines and Emissions Meeting Sponsored by EFI and DOE

Tucson, Arizona, January 18-20, 1999

Methodology

- Define envelope
- Define feedstock characteristics
  - Crude oil
  - Natural gas
  - Coal
- Define (substantiate) process conversion efficiencies
- Calculate carbon emissions for specified quantity of usable end-use energy supplied

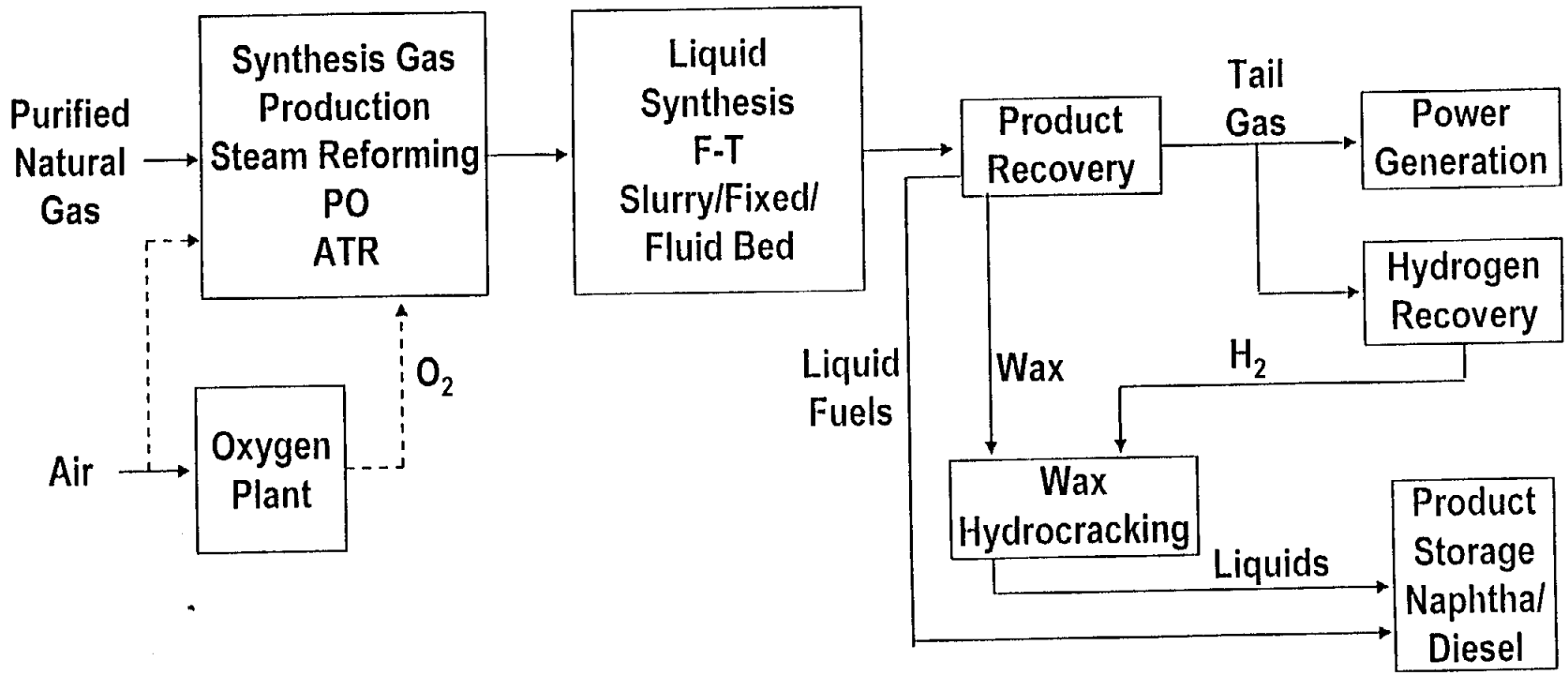
Feedstock Characteristics

Petroleum:	28° API gravity 311 lbs/barrel 5.7 MM Btu/barrel 0.86 Carbon
Natural Gas:	100% CH_4 23,875 Btu/lb (HHV) 0.75 Carbon
Coal:	0.70 Carbon 24 MM Btu/ton

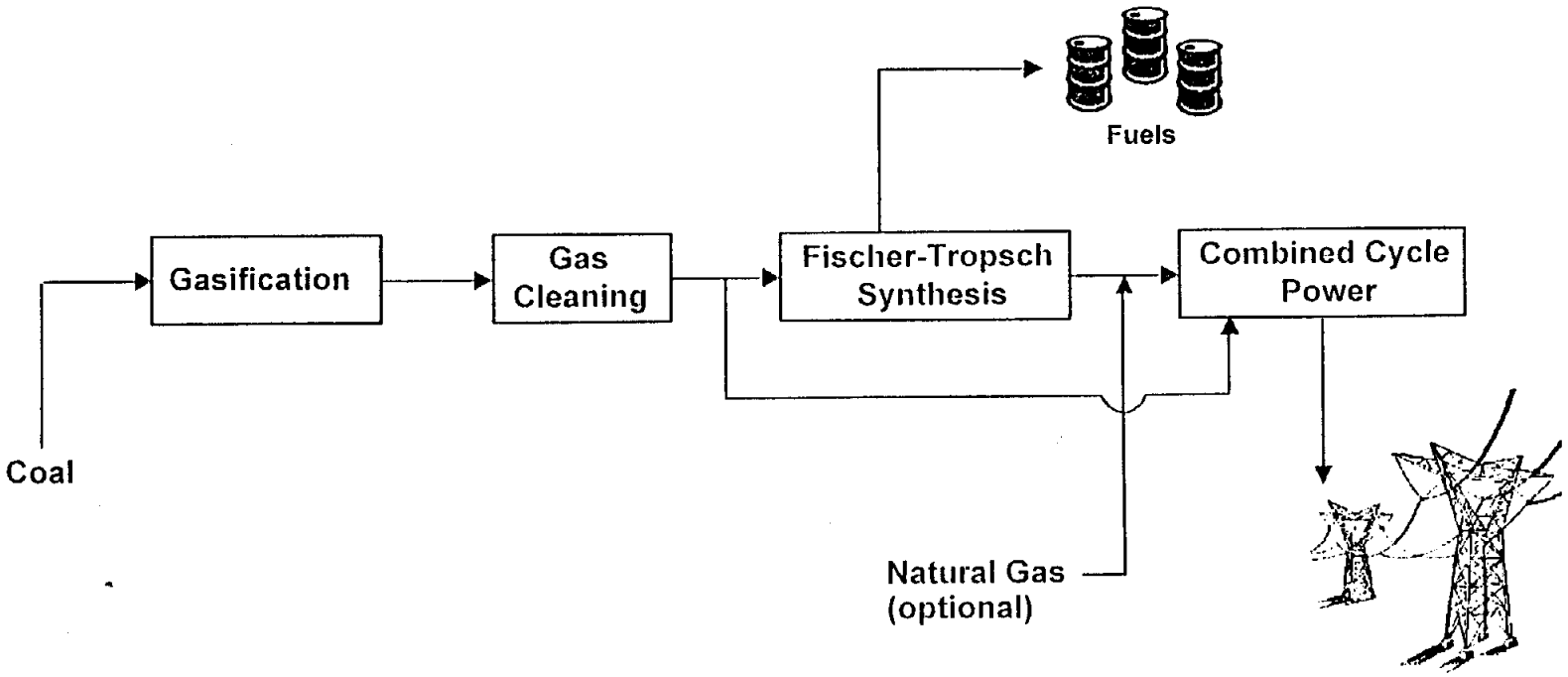
Conversion Processes Considered

- Crude petroleum refining to finished transportation fuels
- Conversion of natural gas to Fischer-Tropsch fuels (GTL)
- Coproduction of F-T fuels and power from coal (and natural gas)

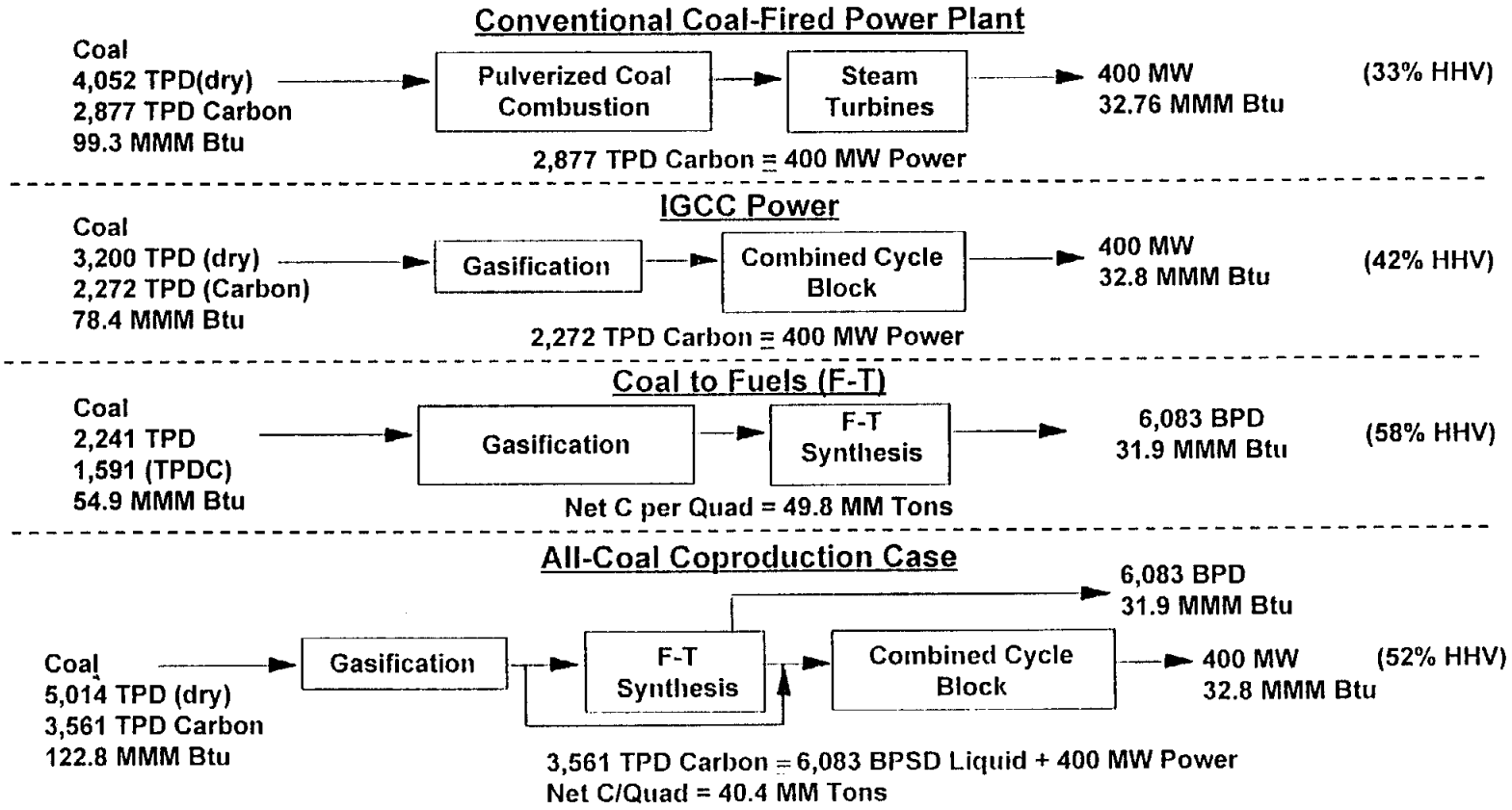
Conversion of Natural Gas to Fischer-Tropsch Fuels (GTL)



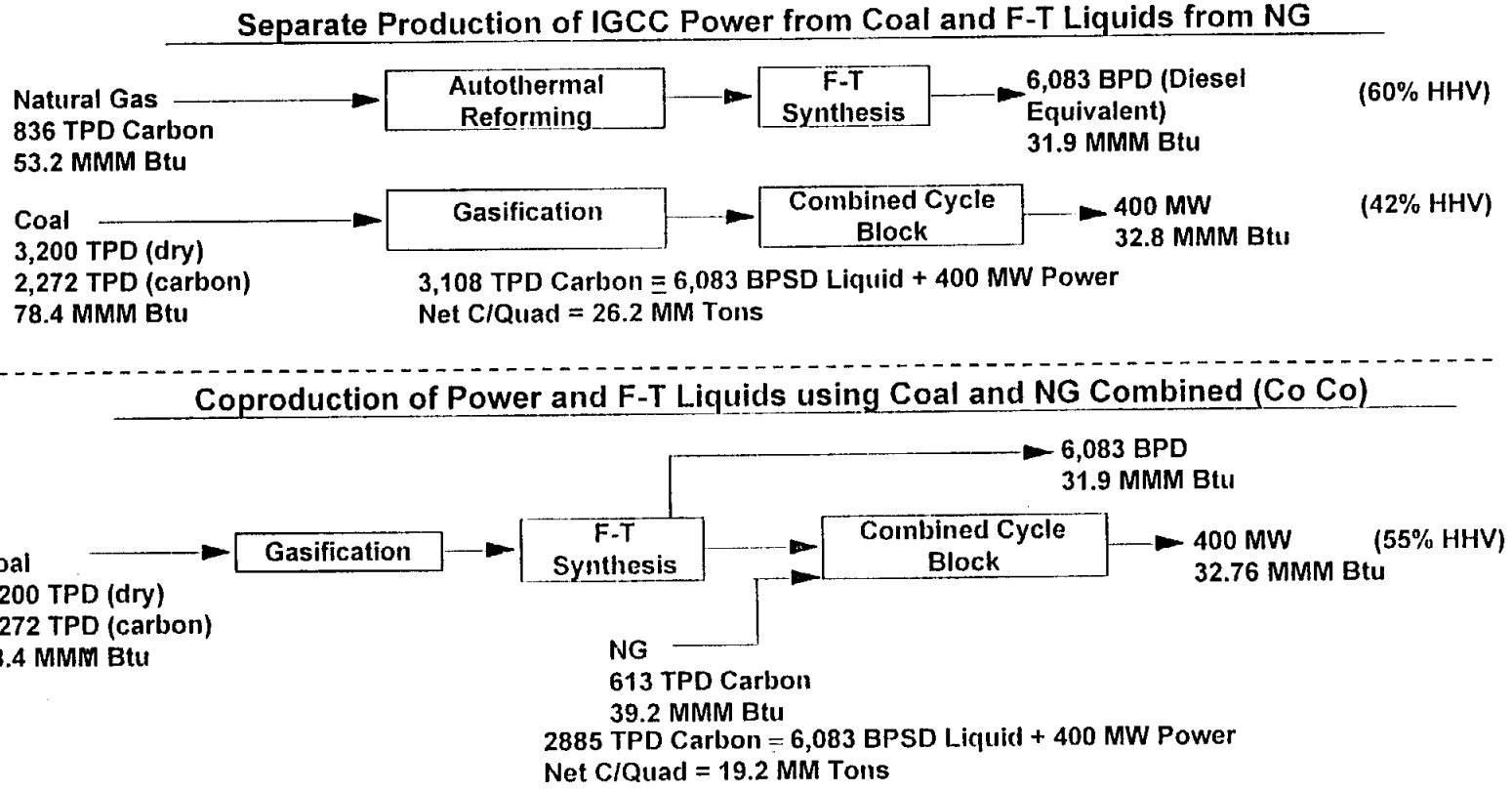
Coproduction of F-T Fuels as Power from Coal (and Natural Gas)



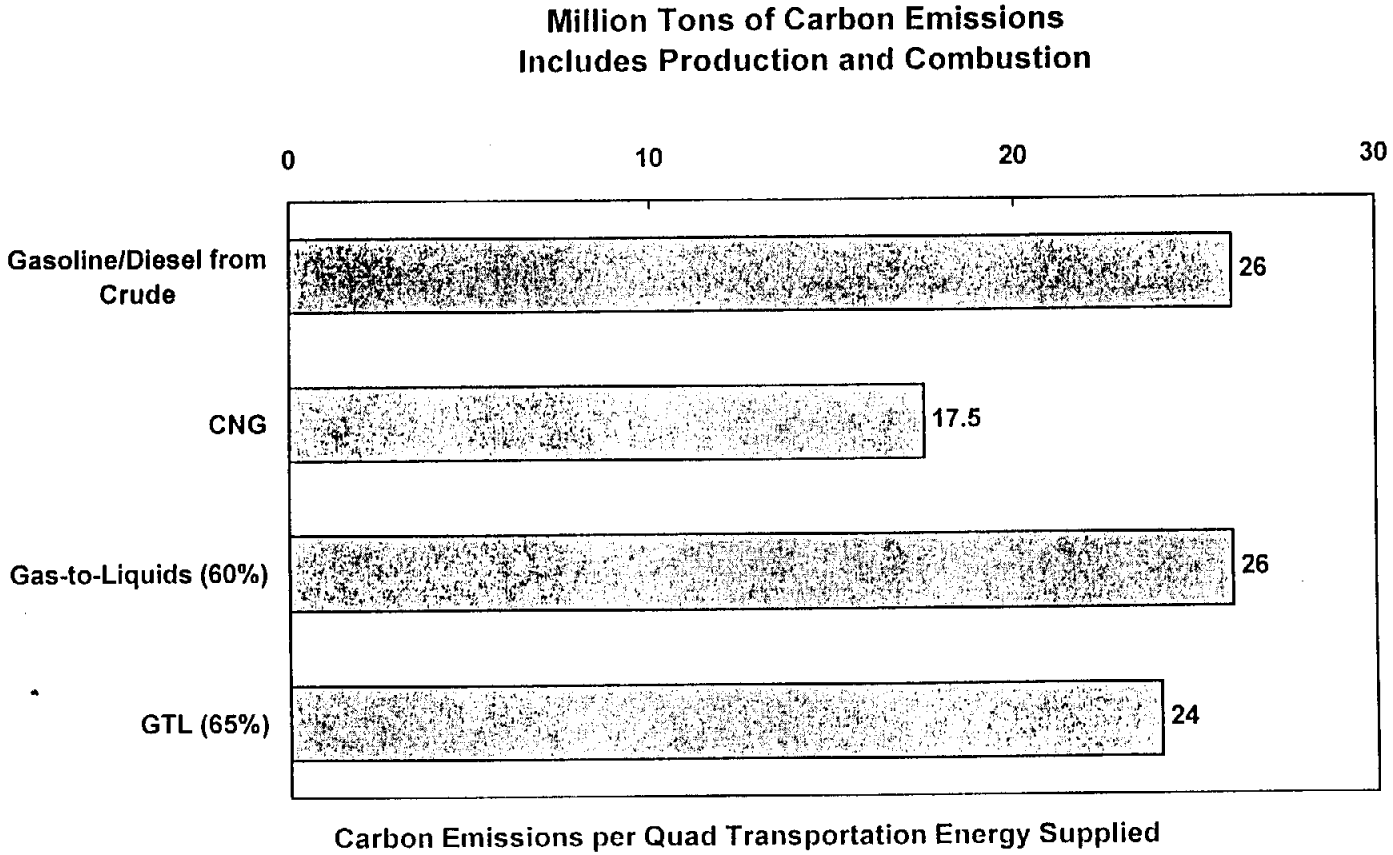
Coal-Based Energy Conversion Systems



Separate Production vs. Coproduction of F-T Liquids and Power

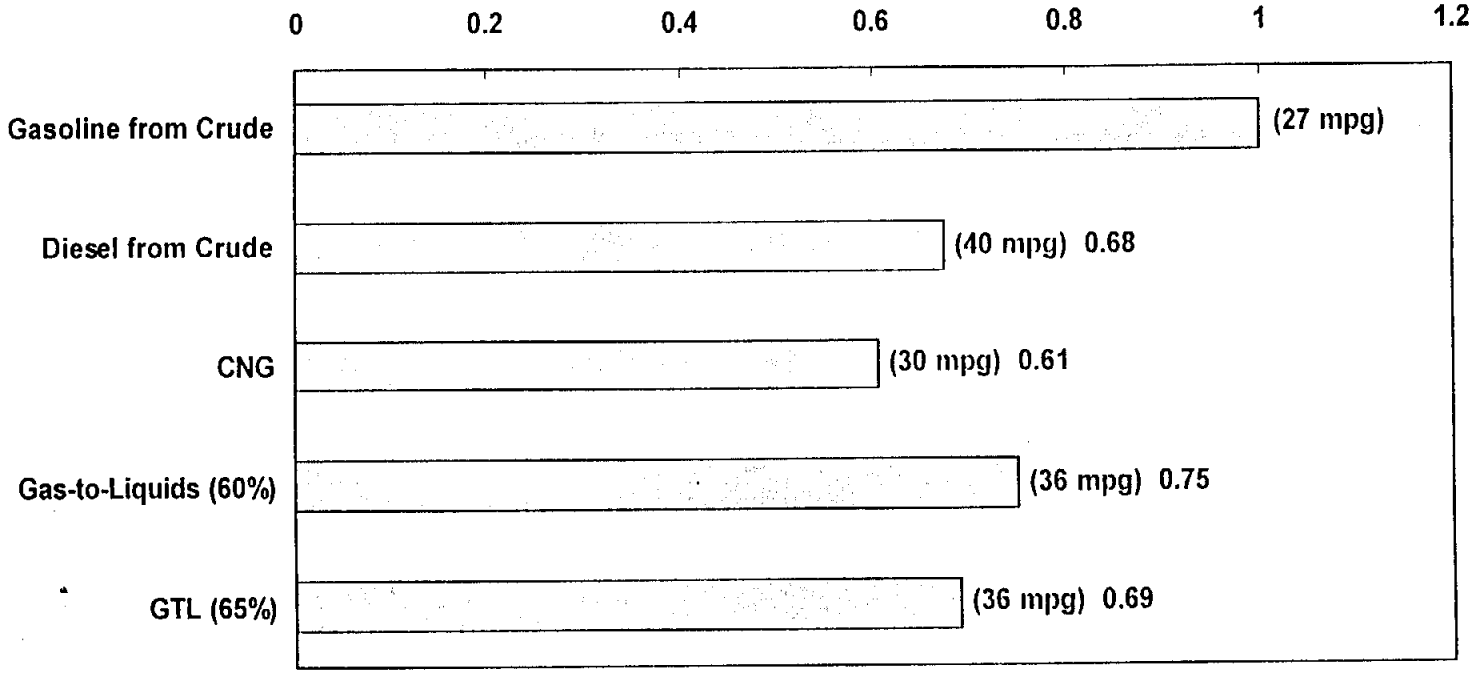


Carbon Emissions
(Natural Gas Based Systems)



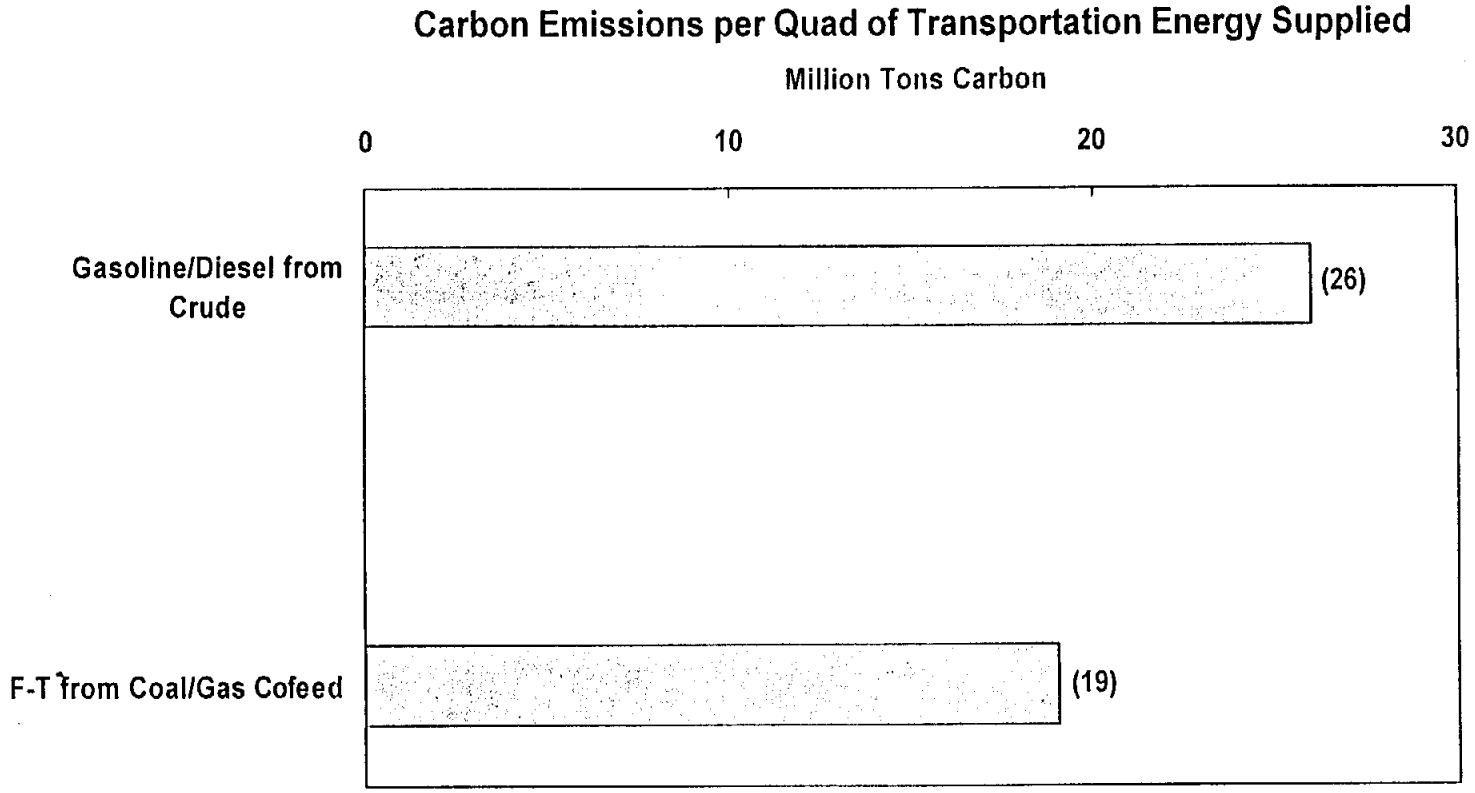
Carbon Emissions
(Natural Gas Based Systems)

Carbon Emissions per Mile Relative to Gasoline from Crude Includes Production, Combustion, and Relative Engine Efficiency



F-T Liquids from GTL amount to 2/3 Diesel, 1/3 Gasoline

Carbon Emissions
(Coal and Natural Gas Based Systems)



Carbon Emissions
(Coal and Natural Gas Based Systems)